

CLAIMS

1. A two-dimensional photonic crystal surface-emitting laser comprising a photonic crystal which has a photonic crystal periodic structure located in or near an active layer which emits light when carriers are injected thereto, said photonic crystal periodic structure having media with different refractive indices in two-dimensional periodic array, wherein:

said photonic crystal periodic structure is of a square lattice structure or a rectangular lattice structure which has translation symmetry but does not have rotation symmetry.

2. A two-dimensional photonic crystal surface-emitting laser according to claim 1, wherein:

the photonic crystal comprises substantially triangular lattice points.

3. A two-dimensional photonic crystal surface-emitting laser according to claim 1, wherein:

the photonic crystal comprises lattice points in a shape of a combination of relatively large substantial circles and relatively small substantial circles.

4. A two-dimensional photonic crystal surface-emitting laser according to claim 1, wherein:

the photonic crystal comprises lattice points each of which is

made of two or more media with different refractive indices or each of which is made of a medium with a refractive index distribution.

5. A two-dimensional photonic crystal surface-emitting laser comprising a photonic crystal which has a photonic crystal periodic structure located in or near an active layer which emits light when carriers are injected thereto, said photonic crystal periodic structure having media with different refractive indices in two-dimensional periodic array, wherein:

said photonic crystal periodic structure is of a square lattice structure or a rectangular lattice structure which is classified into p1, pm, pg or cm by a classification method under IUC (International Union of Crystallography in 1952).

6. A two-dimensional photonic crystal surface-emitting laser according to claim 5, wherein:

the photonic crystal comprises substantially triangular lattice points.

7. A two-dimensional photonic crystal surface-emitting laser according to claim 5, wherein:

the photonic crystal comprises lattice points in a shape of a combination of relatively large substantial circles and relatively small substantial circles.

8. A two-dimensional photonic crystal surface-emitting laser

according to claim 5, wherein:

the photonic crystal comprises lattice points each of which is made of two or more media with different refractive indices or each of which is made of a medium with a refractive index distribution.